

Date: Thursday, 3/23/2006 1:20:22 PM
 User: COSS systems

Process Sheet

Customer :	CU-DAR001 Dart Helicopters Services	Drawing Name :	212/205 HIGH AFT X-TUBE ASSEMBLY	
Job Number :	26320			
Estimate Number :	10257			
P.O. Number :	N/A	Part Number :	D212664201	
This Issue :	3/23/2006	Drawing Number :	D212-664-241 REV B	
Prsht Rev. :	NC	Project Number :	N/A	
First Issue :	N/A	Drawing Revision :	B	
Previous Run :	26243	Material :	N/A	
Written By :	<u>SEE COMMENT BELOW</u>		Due Date :	4/15/2006
Checked & Approved By :	<u>[Signature]</u>		Qty:	1 Um: Each
Comment :	Est Rev:E 04.02.16 Reformat K/DS			

Additional Product

Job Number:



Seq. #:	Machine Or Operation:	Description :
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1.0

DC

DOCUMENT CONTROL

**Comment:** DOCUMENT CONTROL

Photocopy bluefile and create labels as per PPP D212-664-201CHG002

KS 06.06.19

2.0

D6006129

Crosstube material

**Comment:** Qty.: 1.0000 Each(s)/Unit Total : 1.0000 Each(s)

Pick:

Qty Part number Description Batch

1 D6006-129 Crosstube 23970

Check OD = 3.250"; ID = 2.220"

MS 06/03/23

3.0

MORI SEIKI

MORI SEIKI CNC LATHE LARGE

**Comment:** MORI SEIKI CNC LATHE LARGE

1-Fill tube with sand & install plugs DT8534 on both ends as per Folio FA114

MS 06/03/23

2-Turn first side as per Folio FA114

MS 06/03/23

3-Deburr & Inspect for surface damage. Repair damage within limits as per Dwg D212-664-241.

4.0

QC1

INSPECT ALL DIM TO DIM SHEET

**Comment:** INSPECT ALL DIM TO DIM SHEET

MS 06/03/24

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

QA: N/C Closed: _____ Date: _____

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

NOTE: Date & initial all entries

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Drawing Name: 212/205 HIGH AFT X-TUBE ASSEMBLY

Job Number: 26320

Part Number: D212664201

Job Number:



Seq. #:

Machine Or Operation:

Description :

5.0

MORI SEIKI

MORI SEIKI CNC LATHE LARGE



Comment: MORI SEIKI CNC LATHE LARGE

1-Turn second side as per Folio FA114

M8

06/03/23

2-Deburr & Inspect for surface damage. Repair damage within limits as per Dwg D212-664-241.

6.0

QC1

INSPECT ALL DIM TO DIM SHEET



Comment: INSPECT ALL DIM TO DIM SHEET

M8

06/03/23

7.0

QC8

SECOND CHECK



Comment: SECOND CHECK

En

06/03/24

8.0

MORI SEIKI

MORI SEIKI CNC LATHE LARGE



Comment: MORI SEIKI CNC LATHE LARGE

1-Polish entire outside surface of crosstube

M8

06/03/24

2-Remove sand and plugs

M8

06/03/24

3-Scribe part # and batch # using vibrating stylus as per Dwg D212-664-241

M8

06/03/24

9.0

HAND FINISHING1

HAND FINISHING RESOURCE #1



Comment: HAND FINISHING RESOURCE #1

Chemical Conversion Coat as per QSI 005 4.1 within 24 hours of machining

85

06-06-07

10.0

QC5

INSPECT WORK TO CURRENT STEP



Comment: INSPECT WORK TO CURRENT STEP

Pr 06-07-14(1)

11.0

BENDING

BENDING MACHINE



Comment: BENDING MACHINE

Bend tube as per Dwg D212-664-241 using CNC bender program 212-af and Folio FT007

DP6-7-17

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector
	1						
	2						

Part No: 1 PAR #: 11 Fault Category: 1 NCR: Yes No DQA: 1 Date: 1
 QA: N/C Closed: 1 Date: 1

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

NOTE: Date & initial all entries

Date: Thursday, 3/23/2006 1:20:22 PM
User: COSS systems

Process Sheet

Customer: CU-DAR001 Dart Helicopters Services

Drawing Name: 212/205 HIGH AFT X-TUBE ASSEMBLY

Job Number: 26320

Part Number: D212664201

Job Number:



Seq. #:

Machine Or Operation:

Description :

12.0

QC6

DIMENSIONAL CHECK



Comment: DIMENSIONAL CHECK

13.0

LANDING GEAR 1

LANDING GEAR RESOURCE 1



Comment: LANDING GEAR RESOURCE 1

1-Drill pilot holes in tube as per Dwg D212-664-241 using drill Jig DT8550 & DT8551

2-Ream hole to finish size in tube as per Dwg D212-664-241 using drill Jig DT8550 & DT8551. Check dimensions between holes, both sides on both cuffs, to ensure alignment with saddle holes.

3-Deburr & Inspect for surface damage. Repair damage within limits as per Dwg D212-664-241

14.0

HAND FINISHING1

HAND FINISHING RESOURCE #1



Comment: HAND FINISHING RESOURCE #1

Chemical Conversion Coat as per QSI 005 4.1 within 24 hours of bending and drilling

15.0

QC5

INSPECT WORK TO CURRENT STEP



Comment: INSPECT WORK TO CURRENT STEP

16.0

OUTSIDE SERVICE

OUTSIDE SERVICES



Comment: Sub-Contracting OUTSIDE SERVICES

Liquid Penetrant Inspection as per QSI 038

Issue P/O: 1717

LPI as per ASTM 1417 Level 2

Attach copy of NDT results to work order

17.0

PACKAGING 1

PACKAGING RESOURCE #1



Comment: PACKAGING RESOURCE #1

Inspect for transit damage Ensure copy of NDT results attached to work order.

18.0

QC6

DIMENSIONAL CHECK



Comment: DIMENSIONAL CHECK

Inspect for damage & ensure results are as per Dwg D212-664-241

Dart Aerospace Ltd

W/O:		WORK ORDER CHANGES						
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector	
06-07-19	15	QC3 for Alodine to add on estimate. 2	E	06-07-24		<i>[Signature]</i>	<i>[Signature]</i> 06-07-19	
06-07-21	18	QC5 req'd - Perm. change	E	06-07-26			<i>[Signature]</i> 06-07-21	

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes ☒ No ☐ DQA: ☒ Date: 06/07/26
 QA: N/C Closed: _____ Date: _____

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector	
		Initial Chief Eng	Action Description Chief Eng	Sign & Date				

NOTE: Date & initial all entries

Process Sheet

Customer: CU-DAR001 Dart Helicopters Services

Drawing Name: 212/205 HIGH AFT X-TUBE ASSEMBLY

Job Number: 26320

Part Number: D212664201

Job Number:



Seq. #:

Machine Or Operation:

Description :

19.0

SPRAY PAINTING

SPRAY PAINTING



Comment: SPRAY PAINTING

1-Prime inside and outside crosstube as per QSI 005 4.2

FC 06 07 21

①

2-Paint outside crosstube with White Imron as per QSI 005 4.2

M 06 07 24

①

20.0

QC14

Inspect Spray Paint



Comment: Inspect Spray Paint

Then, Wrap in plastic bag to protect from scratches

IT 06-07-25

21.0

D2856600

Abrasion Strip



Comment: Qty.: 0.8400 f(s)/Unit Total : 0.8400 f(s)

Pick:

Qty Part number Description Batch

2 D2856-600-1009 Abrasion Strip B24328

IT 06-07-25

22.0

D29401

Support



Comment: Qty.: 2.0000 Each(s)/Unit Total : 2.0000 Each(s)

Pick:

Qty Part number Description Batch

2 D2940-1 Support B25594

IT 06-07-25

23.0

MS2192028

Clamp



Comment: Qty.: 4.0000 Each(s)/Unit Total : 4.0000 Each(s)

Pick:

Qty Part number Description Batch

4 MS21920-28 Clamp M100479

IT 06-07-25

24.0

LANDING GEAR 1

LANDING GEAR RESOURCE 1



Comment: LANDING GEAR RESOURCE 1

1-Install abrasion strips as per QSI 035 using DT8582

IT 06-07-25

2-Install supports and clamps as per Dwg D212-664-241. Torque clamps to 80-100 in lb.

45 06-07-25

W/O:		WORK ORDER CHANGES						
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector	

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

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Customer: CU-DAR001 Dart Helicopters Services

Drawing Name: 212/205 HIGH AFT X-TUBE ASSEMBLY

Job Number: 26320

Part Number: D212664201

Job Number:



Seq. #: Machine Or Operation: Description :

25.0

QC5

INSPECT WORK TO CURRENT STEP



Comment: INSPECT WORK TO CURRENT STEP

2607.25 (1)

26.0

PACKAGING 1

PACKAGING RESOURCE #1



Comment: PACKAGING RESOURCE #1

Pick Packing Kit

27.0

D34281

Placard



Comment: Qty.: 1.0000 Each(s)/Unit Total: 1.0000 Each(s)

Pick: Packing Kit

Qty Part number

Description Batch

1 D3428-1 PLACARD

B26018 ✓

28.0

AN640A

Bolt



Comment: Qty.: 4.0000 Each(s)/Unit Total: 4.0000 Each(s)

Pick: Packing Kit

Qty Part number

Description Batch

4 AN6-40A

Bolt

M101124 ✓

29.0

AN641A

Bolt



Comment: Qty.: 2.0000 Each(s)/Unit Total: 2.0000 Each(s)

Pick: Packing Kit

Qty Part number

Description Batch

4 AN6-41A

BOLT

M19633 ✓

30.0

AN960JD616

Washer



Comment: Qty.: 18.0000 Each(s)/Unit Total: 18.0000 Each(s)

Pick: Packing Kit

Qty Part number

Description Batch

18 46 AN960JD616

Washer

M100326 ✓

31.0

MS21042L6

Nut



Comment: Qty.: 6.0000 Each(s)/Unit Total: 6.0000 Each(s)

Pick: Packing Kit

Qty Part number

Description Batch

6 MS21042L6

Nut (or -6)

M100151 ✓

2607/26 (1)

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

QA: N/C Closed: _____ Date: _____

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			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

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Process Sheet

Customer: CU-DAR001 Dart Helicopters Services

Drawing Name: 212/205 HIGH AFT X-TUBE ASSEMBLY

Job Number: 26320

Part Number: D212664201

Job Number:



Seq. #:

Machine Or Operation:

Description :

32.0

QC4

INSPECT 100% KITS FOR COMPLETENESS



Comment: INSPECT 100% KITS FOR COMPLETENESS

AL 06/07/26 (1)

33.0

PACKAGING 1

PACKAGING RESOURCE #1



Comment: HAND FINISHING RESOURCE #1

Identify and pack for shipping as per PPP D212-664-201

NEV B

PU 06/17/26 (1)

34.0

DC

DOCUMENT CONTROL



Comment: DOCUMENT CONTROL

Inspection Level 21

DP 06/07/26 (1)

Job Completion



HJ 06.07.26

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

QA: N/C Closed: _____ Date: _____

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
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			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

NOTE: Date & initial all entries

DART AEROSPACE LTD	Work Order:	
Description: Crosstube Assembly (205/212 High Aft)	Part Number:	D212-664-241
Inspection Dwg: D212-664-241 Rev: B		Page 1 of 1

FIRST ARTICLE INSPECTION CHECKLIST

☒ **First Article**
☐ **Prototype**

Inspection Sheet Drawing Dimension		Tolerance	Actual Dimension	Accept	Reject	Method of Inspection	Comments
SIDE A	0.200	+/-0.010	.200	✓			
	R0.063	+/-0.010	.063	✓			
	2.990	+0.005/-0.000	2.994	✓			
	5.237	+/-0.030	5.250	✓			
	2.600	+0.005/-0.000	2.604	✓			
	2.686	+0.005/-0.000	2.690	✓			
	2.770	+0.005/-0.000	2.775	✓			
	2.854	+0.005/-0.000	2.858	✓			
	2.938	+0.005/-0.000	2.942	✓			
	3.021	+0.005/-0.000	3.026	✓			
	3.133	+0.005/-0.000	3.138	✓			
	3.179	+0.005/-0.000	3.184	✓			
SIDE B	0.200	+/-0.010	.200	✓			
	R0.063	+/-0.010	.063	✓			
	2.990	+0.005/-0.000	2.995	✓			
	5.237	+/-0.030	5.250	✓			
	2.600	+0.005/-0.000	2.605	✓			
	2.686	+0.005/-0.000	2.690	✓			
	2.770	+0.005/-0.000	2.775	✓			
	2.854	+0.005/-0.000	2.859	✓			
	2.938	+0.005/-0.000	2.942	✓			
	3.021	+0.005/-0.000	3.026	✓			
	3.133	+0.005/-0.000	3.138	✓			
	3.179	+0.005/-0.000	3.183	✓			
	124.36	+/-0.020					

Measured by: MS	Audited by: EP	Prototype Approval:	N/A
Date: 06/03/23	Date: 06/03/24	Date:	N/A

Rev	Date	Change	Revised by	Approved
A	05.04.27	New Issue (P/O D412-664-201)	KJ/JLM	
B	06.03.09	Tolerance for 5.237 was +/-0.001	KJ/JLM	

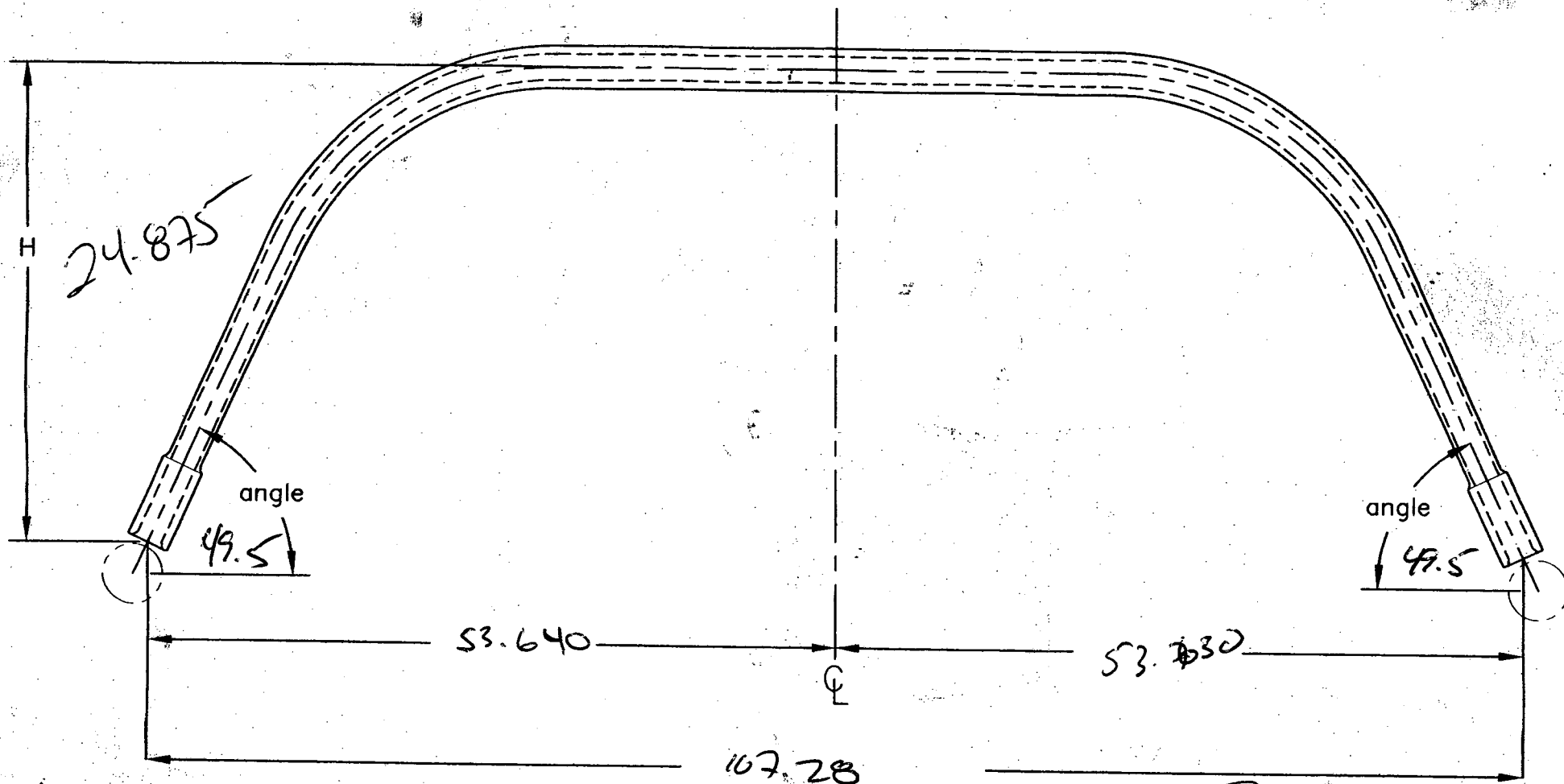
W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

QA: N/C Closed: _____ Date: _____

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NOTE: Date & initial all entries



DATE: 0607-17

DESCRIPTION: D212-664-201

BATCH NO: 26320

DRAWING: 212-664-241 R.B

H: 24.30 } $\pm .060$

1/2 SPAN: 53.72

TOTAL SPAN: 107.44

ANGLE: 50 \pm 2

[Signature]
0607.19

L Lacelle

From: David Shepherd [dshepherd@dartaero.com]
Sent: July 19, 2006 9:19 AM
To: 'Jason Murdoch'
Cc: 'L Lacelle'
Subject: RE: per your request

If B27085 has a height of 24.6875, then it is also acceptable.

David

From: Jason Murdoch [mailto:jmurdoch@dartaero.com]
Sent: Wednesday, July 19, 2006 7:05 AM
To: 'David Shepherd'
Subject: RE: per your request

Ya the tube is 24 not 23.

jmurdoch@dartaero.com

Q.C.Inspector

From: David Shepherd [mailto:dshepherd@dartaero.com]
Sent: July 18, 2006 10:18 AM
To: 'Jason Murdoch'
Cc: 'L Lacelle'
Subject: RE: per your request

B26320 is ACCEPTABLE.

B27085 is UNACCEPTABLE because of the height. Are you sure its not 24.6875 ir stead of 23.6875?

David

From: Jason Murdoch [mailto:jmurdoch@dartaero.com]
Sent: Tuesday, July 18, 2006 3:33 AM
To: davids@dartaero.com
Subject: FW: per your request

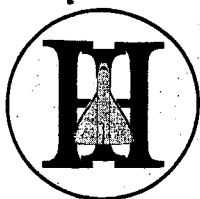
Are these dims acceptable? Check out the height, as well as the span. The tubes fit the jig very well, but slightly on the inside. The blocks lift inwards approximately a 1/4".

jmurdoch@dartaero.com

Q.C.Inspector

From: Brigitte Golden [mailto:bgolden@dartaero.com]
Sent: July 17, 2006 10:54 AM
To: jmurdoch@dartaero.com
Subject: per your request

19/07/2006



HeathAir

INTERNATIONAL (1991) INC.

681 Ave. Lepine, Dorval, Québec H9P 1G3
Tél.: (514) 636-1000 • Fax: (514) 636-0031

W.O. N° 34517

A.M.O. Number: 46/90

NON-DESTRUCTIVE TESTING REPORT

AIRCRAFT / COMPONENT INFORMATION

REGISTRATION: -

MODEL/TYPE: -

SERIAL NUMBER: -

TOTAL HR/LDG: -

OPERATED BY: -

BASED AT: -

INSPECTION REQUIREMENTS

Carry out FPI of (4) cross tubes (external surface) as per ASTM E-1417-05 and the Dart QSI 038, Section 4.1.1 (on file at client) - parts delivered to HeathAir.

Qty (2) P/N D212-664-201 Cross tubes S/N's B27630 and B26320.

Qty (2) P/N D412-664-203 Cross tubes S/N's B27389 and B27261.

☐ RADIOGRAPHY

☐ ULTRASONIC

☒ PENETRANT

☐ MAGNETIC PARTICLE

☐ EDDY CURRENT

INSPECTION REPORT

Fluorescent penetrant inspection was performed in accordance with the above requirements on (4) Cross Tubes.

Note: A Level 3 penetrant was substituted for the requested Level 2 (3 is more sensitive) Ardrex 970P25E Batch #04B503.

(4) cross tubes inspected. (4) PASSED inspection / (0) FAILED inspection.

THE MAINTENANCE DESCRIBED ABOVE HAS BEEN PERFORMED IN ACCORDANCE WITH
THE APPLICABLE STANDARDS OF AIRWORTHINESS

INSPECTED BY: 

DATE July 19, 2006

INSPECTION
STAMP(S)



CUSTOMER INFORMATION

CUSTOMER: Dart Aerospace

P.O. NUMBER

1717

ADDRESS:

CONTACT NAME:

Linda

LABOUR	@	\$
MATERIALS	@	
TRAVEL EXPENSES	@	GST
HOTEL EXPENSES	@	PST

INVOICE NO.

TOTAL \$

WHITE COPY - INSPECTION FILE • YELLOW COPY - CUSTOMER • PINK COPY - ACCOUNTANT